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ABSTRACT

This study assessed the usefulness of the College Student Inventory (CSI) (M. Strait, 1988) as a needs assessment tool in community colleges by determining which, if any, of the 19 scales of the CSI distinguish enrollment status and academic success in students attending community colleges. A total sample of 1,368 students at 8 community colleges completed the CSI. Significant differences were found for: (1) 2 of the 19 scales; (2) persisters and nonpersisters on the Academic Assistance scale; and (3) academically successful students and academically unsuccessful students on the Career Counseling scale. These two scales contribute to the CSI general category, Receptivity to Support Services, and may help identify students at risk of leaving college. The paper also discusses the implications of these findings for the development of practices that make retention an outcome rather than a goal. (Contains 27 references.) (SLD)

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Usefulness of the College Student Inventory

As a Needs Assessment Tool in Community Colleges

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The Usefulness of the College Student Inventory as a Needs Assessment Tool in Community Colleges

Finding solutions to student attrition is vital to society as a whole and to the survival of most colleges and universities. For institutions, given the challenge of competition for an increasingly diverse pool of students, external forces demanding more accountability (Burr et al., 1999; Antley, 1999), and increases in the costs of higher education, improved retention is viewed as "the only reasonable course of action left to insure their survival" (Tinto, 1993, p. 2). Community colleges face even more difficult challenges because of open admission policies. The open door becomes a revolving door for many students who enter only to leave before achieving their goals, many within the first semester (O'Banion, 1997; Roueche & Roueche, 1993). Part of the equation in retaining students at risk of dropping out or leaving college is the recommendation to identify students' needs early in their higher education experience (Burr et al., 1999; Schreiner, 1991; Tinto, 1993). Even with retention mechanisms in place, identifying these students entails a lengthy, cooperative effort of faculty and staff to adequately address the issue; in too many cases, student identification comes too late at the request of a course drop form or an exit interview. Efforts are being made, however, to take a proactive stance to target services for students at risk of leaving college. The College Student Inventory has the potential to identify these students. While a number of the items on the CSI address issues common to four-year colleges, previous studies have determined its validity with combined data from both two-year and four-year colleges and universities (Schreiner, 1991). By determining the usefulness of the CSI as a needs

assessment tool in community colleges, administrators will have additional information for use in policy decisions regarding retention efforts.

Statement of the Purpose

The purpose of this study was to assess the usefulness of the College Student Inventory as a needs assessment tool in community colleges by determining which, if any, of the 19 scales of the College Student Inventory distinguish enrollment status and academic success in students attending community colleges. This was done to more accurately assess students' needs upon entry into higher education.

To perform this study, a sample of student responses measured by the College Student Inventory relative to the 19 scales of the College Student Inventory was examined. Through this process, a determination was made as to whether differences exist between community college students who persist and non-persisters, those who do not persist, and whether differences exist between academically successful students and academically unsuccessful students attending community colleges.

Limitations and Delimitations

The findings of the study were limited to information included in the enrollment data and student responses to the College Student Inventory. A majority of the participating colleges did not response to the "Reason for Leaving College" inquiry on the enrollment data spreadsheet. Data sources did not include socioeconomic status, an important variable in the discussion of college attrition research. Student responses to the College Student Inventory were self-reported. While the CSI includes an Internal Validity scale, control of student responses, in general, was unavailable. Student selection for

participation in this study was made by the community colleges from a variety of subgroups of the incoming freshman class, thus creating a heterogeneous sample.

Method

Selection of Participants

In special situations the use of a purposive sample is chosen as the form of data collection (Neuman, 1997). In the current study, the purposive sample provided the means to investigate a specialized population of students attending community colleges in the United States. The exploration of the purposive sample allowed for the examination of enrollment data and students' responses to the College Student Inventory from community colleges only through permission of the publisher, USA Group Noel-Levitz, Inc. Each institution supplied information regarding each CSI respondent's cumulative GPA, terms of enrollment, current enrollment status, and reason for leaving college. A questionnaire containing institutional demographic information was included in the database.

A total of 1,368 students at eight community colleges were selected from the Noel-Levitz database. The institutions were located in the northern, eastern, and western regions of the United States. Each of these institutions administered the College Student Inventory to incoming freshman students in the first semester of college between the years of 1996 to 1999. Student information included in the College Student Inventory included the following attributes: native language, ethnicity, marital status, and mother's and father's highest level of education.

College Student Inventory Instrument

In 1971, Michael L. Stratil, author of the College Student Inventory, began a seven-year research program in the area of academic and social motivation as it applied to students. Stratil sought to create a coherent framework for understanding human motivation in general, to identify the specific motivational variables most closely related to persistence and academic success in college, and to develop a reliable and valid instrument for measuring these variables (Stratil, 1988). His research resulted in the development of the original version of the College Student Inventory (titled the "Stratil Counseling Inventory"), which was published in 1984. The instrument was revised in 1987 after considerable field testing and the current 1988 version reflects the revisions made on the basis of statistical analyses and input from expert judges as to item content. A Canadian version was also developed in 1988 (Stratil, 1988; USA Group Noel-Levitz, 1993). The College Student Inventory is a standardized, nationally normed, multidimensional inventory of student motivation published by USA Group Noel-Levitz (Stratil, 1988; USA Group Noel-Levitz, 1993).

The purpose of the College Student Inventory is to give colleges and universities a survey instrument that can be used proactively to help improve student retention (Schreiner, 1991). The instrument is comprised of 194 Likert-type items, consisting of 19 independent scales. Each item uses a Likert scale of 1 to 7 with 1 equaling "Not At All True" and with 7 meaning "Completely True." Used as an "early warning system," the College Student Inventory can accurately identify at-risk students for intervention. The 19 scales of the College Student Inventory are designed to identify those predispositions and precollege experiences and attributes, which may subsequently influence the

student's ability to succeed and persist in college. In addition, the College Student Inventory report contains demographic information about the student and a list of prioritized recommendations for intervention, weighted on the basis of the student's need for campus service and expressed desire for service (Schreiner, 1991).

The College Student Inventory surveys student attitudes relative to the following five general categories: (1) Academic Motivation, (2) Social Motivation, (3) General Coping Skills, (4) Receptivity to Support Services, and (5) Initial Impression. The five general categories contain the following 19 major independent scales, or variables. The general category, Academic Motivation, includes the following scales: Study Habits, Intellectual Interests, Academic Confidence, Desire to Finish College, and Attitude Toward Educators. Social Motivation includes the following scales: Self-Reliance, Sociability, and Leadership. The general category, General Coping Skills, includes the following scales: Ease of Transition, Family Emotional Support, Openness, Career Planning, and Sense of Financial Security. Receptivity to Support Services includes the following scales: Receptivity to Academic Assistance, Receptivity to Personal Counseling, Receptivity to Social Enrichment, and Receptivity to Career Counseling. The general category, Initial Impression, contains one scale: Initial Impression.

Reliability

Throughout the development of the College Student Inventory, a central goal has been made to maximize the homogeneity (internal consistency reliability) of each scale while keeping the length of the inventory relatively short (USA Group Noel-Levitz, 1993). This goal was accomplished through the research design that featured a large initial pool of preliminary items for each scale; item testing with large samples; an item-

selection procedure that reduced content redundancy and maximized inter-item correlations; and pilot testing of preliminary scales that resulted in further refinements to the final inventory (USA Group Noel-Levitz, 1993). As a result of these procedures, the CSI's 19 major independent scales have an average homogeneity coefficient (coefficient alpha) of .80 despite an average length of only 8.5 items.

The CSI compares favorably to several well respected personality inventories. Jackson's Personality Research Form (PRF Form E, 16 items per scale, N=84) obtained an average homogeneity coefficient of .72. The Meyers-Briggs Type Indicator, used by many college counseling centers, has an average coefficient alpha reliability of .81, while the California Psychological Inventory (CPI), respected by psychologists, has an average coefficient alpha reliability of .72 (USA Group Noel-Levitz, 1993). With this solid homogeneity as a base, the CSI's stability (test-retest reliability) is also quite good. Data from the latest research indicate an average stability coefficient of .80 for the CSI's 19 major scales (USA Group Noel-Levitz, 1993).

Validity

The publishers of the CSI view the process of assessing its validity as an "on-going one" (USA Group Noel-Levitz, 1993, p. 166). An explanation of three areas of validity most pertinent to the CSI include: content validity, construct validity, and criterion-related validity (most notably predictive validity) (USA Group Noel-Levitz, 1993).

Content Validity. Content validity of an instrument indicates the degree to which the scores yielded adequately represent the content, or conceptual domain, that these

scores purport to measure (Gall, Borg, & Gall, 1996). Several methods were used to build a high degree of validity into the CSI. As Stratil states in USA Group Noel-Levitz, 1993:

> Rather than relying on post hoc factor analysis to define scales, for example, the items for each scale were written with the express intent of measuring a particular variable as accurately as possible. Great care was taken to ensure that the nuances in each item were appropriate to that intent. In addition, a defensiveness scale was used to eliminate items eliciting a tendency to generate falsely positive responses. Through a five-year course of empirical testing, modification and further testing, a concerted effort has been made to maximize the discrimination between the scales. As a result of these efforts, all of the CSI's scales have a high level of content validity. (p. 167).

Construct Validity. Construct validity of an instrument indicates the extent to which the instrument can be shown to assess the construct that it intends to measure (Gall et al., 1996). For this study, a construct is a theoretical construction about the nature of human behavior (Gall et al., 1996). The 19 scales of the CSI are examples of constructs (i.e. Study Habits, Intellectual Interests, Self-Reliance, Sociability, etc.). Evidence of construct validity of the CSI was derived from the homogeneity of the items, the reliability estimates of the scales, the item-total correlations, analysis of the factor structure of the instrument, and the investigation of significant differences in the various CSI scale scores of groups who were theoretically expected to differ in their levels of risk factors (USA Group Noel-Levitz, 1993). Schreiner (1991) contends that the CSI's ability to measure a construct which might be labeled 'risk level' or 'ability to succeed and persist in college' is evident in the homogeneity of the instrument: coefficient alpha

across the 19 scales is .80, item-total correlations average .49, and an analysis of the factor structure indicates that a one-factor maximum likelihood solution is most applicable.

Criterion-related Validity. Criterion-related validity "is determined by relating performance on a test to the performance on another criterion" (Gay & Airasian, 2000, p. 164). Predictive validity is a type of criterion-related validity. Two major national validity studies have been conducted on the CSI (USA Group Noel-Levitz, 1993).

A national validity study was conducted using the CSI's 1987 pilot version (Stratil, 1988). This research investigated dropout-proneness with 3,048 first-year college students. The Dropout Proneness Scale was derived empirically from data collected in the 1987 study. The students were divided into four groups, depending on whether or not they remained in college and whether or not they had obtained a GPA of at least 2.0. Significant differences between persisters and non-persisters, regardless of GPA, were found in Desire to Finish College; "this indicates that this variable was an effective predictor of enrollment status for both the academically successful and the unsuccessful" (USA Group Noel-Levitz, 1993, p. 170). Significant differences were also found between the academically successful students and academically unsuccessful students, regardless of enrollment status. Differences of these two groups were found on four scales: Study Habits, Intellectual Interests, Academic Confidence, and Attitudes Toward Educators. This pattern offered evidence of their criterion validity since theory would lead one to expect these scales to be related to academic performance (Stratil, 1988). This study also correlated first-semester, first-year student grades with each scale. First-semester GPA were significantly correlated with scores on the following scales: Study Habits, Academic

Confidence, Desire to Finish college, Attitude Toward Educators, Openness, self-reported SAT/ACT scores and self-reported high school GPA. These results formed the basis for the CSI's global predictor of academic difficulties (Stratil, 1988).

The most recent validity study conducted on the psychometric properties of the newly revised College Student Inventory surveyed 4,915 college students from forty-six American colleges and universities (Schreiner, 1991). Schreiner reported the following results from the validation study:

> Several methods were utilized to determine if the College Student Inventory is a reliable and valid measure of students' ability to succeed and persist in college. Reliability estimates averaged .80 via coefficient alpha. Factor analysis confirmed that the 194 items loaded on factors, which basically corresponded to their designated scales. Discriminant analyses indicated that the CSI is able to significantly discriminate between dropouts and persisters and by GPA ($p < .0001$). Regression analyses indicated that five of the scales were most predictive of first-year GPA ($r^2 = 48\%$). The MANOVA also found significant differences between dropouts and persisters ($p < .0001$). The CSI therefore appears to be a promising tool for measuring a student's ability to succeed and persist in college. (Schreiner, 1991, p. 1)

Data Collection

Two sources of data were obtained by the publisher of the College Student Inventory for use in the study:

1. The enrollment data from the participating community colleges included demographic and student information gathered from a questionnaire. The colleges

were asked to respond to the following items: type of institution, highest degree offered, total enrollment, selectivity of admissions, academic calendar, term CSI was administered, how CSI was administered, to whom the CSI was administered, level of intervention, type of intervention used, with whom did students meet to discuss the CSI profile, what point in the term was intervention attempted, success of intervention attempts, a rating of other factors, a spreadsheet of each student's cumulative GPA, terms of enrollment, and reason for leaving college, if not re-enrolled.

2. The subjects' responses to the College Student Inventory included student information: native language, ethnicity, mother's and father's highest level of education, and marital status.

The database utilized for this study was provided on two CDs that included raw and translated data described above. Because the students' survey responses, GPA, and retention information were in separate files, the data were combined into one Microsoft Excel spreadsheet. By using the VLOOKUP function in Excel, students' names and social security numbers were matched. Students, whose grade point average (GPA) information was not available, were discarded from the sample. Students who transferred to other colleges/universities were coded as retained (i.e. persisted).

Further organization of the data was required to run the analysis. Each scale required grouping the items that pertained to that particular scale from the Excel spreadsheet. A separate Excel data file was created for each of the 19 scales. A Statistical Application Software system (SAS) data file was then created for each of the 19 scales for use in manipulating the data for the analysis.

Data Analysis

The data analysis conducted for the two hypotheses involved an analysis cycle to determine which, if any, of the 19 scales of the College Student Inventory distinguish enrollment status and academic success in students attending community colleges. The research hypotheses included:

Null Hypothesis 1. There is no significant difference in students who persist (persisters) and those who do not persist (non-persisters) on all 19 scales of the College Student Inventory.

Null Hypothesis 2. There is no significant difference in academically successful students and academically unsuccessful students on all 19 scales of the College Student Inventory.

The data analysis for both hypothesis one and hypothesis two included the Hotelling's T^2 multivariate analysis, analysis of variance (ANOVA), and t-test. If significant differences in any of the 19 scales existed as a result of the Hotelling's T^2 multivariate analysis, the analysis of variance was performed to test for significant differences in the mean responses of each item that comprise the scale. The remaining test in the analysis involved a t-test to indicate which group responded lower or higher than the other to the particular item.

Hotelling's T^2 Multivariate Analysis

For both hypothesis one and hypothesis two, a Hotelling's T^2 multivariate analysis was performed for each of the 19 scales to determine if any differences exist between students who persist and those who do not persist and academically successful students and academically unsuccessful students. A Hotelling's T^2 was performed for each of the 19 scales. The analysis compared the mean responses for persisters to the mean responses

for non-persisters for each scale. This same procedure was used when testing for significance in the GPA groups.

The Hotelling's T^2 statistical test measures two samples on a number of variables (Kachigan, 1986). In this study, the subjects were grouped as Persisters/Non-Persisters and Academically Successful/Academically Unsuccessful (i.e. GPA $\geq$ 2.0 and GPA < 2.0). The independent variables were the 19 scales of the College Student Inventory. If the set of means for one group differs significantly from the set of means for the other group, it would reflect the differential effects of the treatment in the study, the College Student Inventory (Kachigan, 1986). For each of the 19 scales, the Hotelling's T^2 multivariate analysis was conducted in SAS to determine whether the mean for persisters was equal to the mean for non-persisters and whether the mean for the academically successful students was equal to the mean of the academically unsuccessful students. If significant differences exist in any of the 19 scales, the next phase of the analysis cycle, analysis of variance, was performed.

Analysis of Variance

The analysis of variance (ANOVA) was chosen to test for significant difference in the mean responses of each item that comprise the statistically significant scales for the two groups. The ANOVA is a statistical procedure that compares the amount of between-groups variance in individuals' scores with the amount of within-groups variance. If the ratio of between-groups variance to within-groups variance is sufficiently high, this indicates that there is more difference between the groups in their scores on a particular variable than there is within each group (Gall, Borg, & Gall, 1996). The remaining test in

the analysis involved a t-test to determine which group's responses were significantly different for a particular item.

The t-test

The analysis using the t-test examined whether differences exist in the groups' mean responses to the statistically significant items identified by the ANOVA. The t-test is used to determine whether two means are significantly different at a selected probability level (Gay & Airasian, 2000). The results of this test indicate which group (i.e. persisters/non-persisters and academically successful students with GPA $\geq$ 2.0 /academically unsuccessful students with GPA < 2.0) responded significantly lower or higher than another to the item.

The following analysis was conducted on hypothesis one to determine if any differences existed in student responses to the College Student Inventory according to enrollment status of the two groups (i.e. persisters and non-persisters). Hypothesis one was analyzed first by conducting a Hotelling's T^2 multivariate analysis. The first data analysis using Hotelling's T^2 multivariate analysis indicated which, if any, of the 19 scales indicated differences at the p-value < .05 level of significance between the groups (persisters and non-persisters) using enrollment status as the dependent variables. If significant differences existed at the p-value < .05 level for particular scales, the second analysis was performed using ANOVA to determine which items in the scales were significantly different at the p-value < .05 level. The third analysis involved running a t-test to examine the responses of the persister and non-persister groups to each item found statistically significant. The results of the t-test determined if the mean responses for one

group for a particular item were higher than the mean responses of the other group on the same item.

The analysis cycle was repeated for hypothesis two to determine which, if any, differences existed in student responses to the College Student Inventory according to academic standing, those who were academically successful and those who were not (i.e. GPA $\geq$ 2.0 and GPA < than 2.0). Hypothesis two was analyzed first by conducting a Hotelling's T^2 multivariate analysis. The first data analysis using Hotelling's T^2 multivariate analysis indicated which, if any, of the 19 scales indicated differences at the $p < .05$ level of significance between the dependent variables identified as academically successful (GPA $\geq$ 2.0) and academically unsuccessful (GPA < 2.0). If significant differences existed at the p-value <. 05 level for particular scales, the second analysis was performed using ANOVA to determine which items in the scales were significantly different at the p-value <. 05 level. The third analysis involved running a t-test to examine the responses of the GPA groups to each item found statistically significant. The results of the t-test determined if the mean responses for one group for a particular item were higher than the mean responses of the other group on the same item.

Results

Null Hypothesis One

The first null hypothesis proposed that there would be no significant difference in students who persist and those who do not persist on all 19 scales of the College Student Inventory. Based on hypothesis one, the present study sought to determine whether the CSI could distinguish differences in persisters and non-persisters on the 19 scales of the College Student Inventory. For the data analysis of hypothesis one, data were grouped as

either persisters or non-persisters according to enrollment status reported by the participating institutions. The Hotelling's T^2 multivariate analysis determined that one scale, Academic Assistance, was significant at the p-value < .05 level as shown in Table I. The scales are displayed in rank order on level of significance beginning with most significant down to least significant.

Table I

Summary of Multivariate Analysis of Variance Comparisons of 19 Scales for Persisters and Non-Persisters

Scale	p-value
Academic Assistance	0.0001
Initial Impression	0.1330
Ease of Transition	0.1480
Study Habits	0.1652
Career Planning	0.1713
Social Enrichment	0.2211
Financial Support	0.2671
Leadership	0.2734
Sociability	0.3125
Career Counseling	0.3223
Openness	0.4589
Personal Counseling	0.5495
Sense of Financial Security	0.5607
Desire to Finish College	0.6786
Self-Reliance	0.7040
Intellectual Interests	0.7854
Family Emotional Support	0.8374
Attitude Towards Educators	0.9601
Academic Confidence	0.9820

The second analysis was performed using ANOVA to determine which items in the Academic Assistance scale were significantly different at the p-value <. 05 level of significance. The post hoc ANOVA found all six items in the Academic Assistance scale

significant at the .05 level. The items inquired about the respondent's receptivity to support services in the areas of mathematics assistance, test taking skills assistance, study habits assistance, writing skills assistance, tutoring assistance, and reading skills assistance. Table II indicates significant differences in all six items comprising the Academic Assistance scale.

Table II

Summary of Analysis of Variance Comparisons of Persisters and Non-Persisters-Academic Assistance

Source	SS	df	MS	F	p-value
Mathematics Assistance					
Between Groups	141.79	1	141.79	31.04	0.0001
Within Groups	6244.21	1367	4.57		
Total	6386.00	1368			
Test Taking Skills Assistance					
Between Groups	87.6	1	87.60	25.81	0.0001
Within Groups	4640.16	1367	3.39		
Total	4727.76	1368			
Study Habits Assistance					
Between Groups	90.31	1	90.31	24.43	0.0001
Within Groups	5053.32	1367	3.70		
Total	5143.63	1368			
Writing Skills Assistance					
Between Groups	88.97	1	88.97	21.78	0.0001
Within Groups	5583.99	1367	4.08		
Total	5672.97	1368			
Tutoring					
Between Groups	101.96	1	101.96	21.73	0.0015
Within Groups	6414.77	1367	4.69		
Total	6516.73	1368			
Reading Skills Assistance					
Between Groups	45.11	1	45.11	10.10	0.0015
Within Groups	6104.56	1367	4.46		
Total	6149.67	1368			

The third analysis involved utilizing a t-test to examine the subjects' responses to each item found significant in the Academic Assistance scale. This t-test determined if the mean responses for one group for a particular item were higher than the mean responses of the other group on the same item. For all six items of the Academic Assistance scale, the non-persister group responded higher to the Likert-scored items. The subjects responded to a Likert scale of 1 to 7 with 1 equaling "Not At All True" and with 7 meaning "Completely True." Each item prompted the subject to respond to the statement pertaining to the particular type academic assistance (e.g., I would like to receive some individual help with basic mathematics.). Table III summarizes the data.

Table III

Summary of t-test Comparisons of Means Between Persisters and Non-Persisters-Academic Assistance

	n	M	SD	t	p-value
Mathematics assistance					
Non-Persisters	561	3.44	2.26	5.47	0.0001
Persisters	807	2.79	2.04		
Test taking skills assistance					
Non-Persisters	561	5.32	1.75	5.15	0.0001
Persisters	807	4.80	1.90		
Study habits assistance					
Non-Persisters	561	4.87	1.89	4.97	0.0001
Persisters	807	4.34	1.95		
Writing skills assistance					
Non-Persisters	561	4.06	2.08	4.67	0.0001
Persisters	807	3.55	1.98		
Tutoring					
Non-Persisters	561	4.12	2.24	4.66	0.0001
Persisters	807	3.57	2.12		
Reading skills assistance					
Non-Persisters	561	3.43	2.18	3.18	0.003
Persisters	807	3.06	2.07		

Null Hypothesis Two

For the data analysis of hypothesis two, data were grouped as either Academically Successful or Academically Unsuccessful according to enrollment status reported by the participating institutions. Two scales were found to be significant at the .05 level: Academic Assistance and Career Counseling. Further discussion of the analyses of the two statistically significant scales identified by the Hotelling's T^2 analysis follows. Results of the analyses of the Academic Assistance scale are discussed first followed by the analyses of the Career Counseling scale.

Table IV

Summary of Multivariate Analysis of Variance Comparisons of 19 Scales for GPA

Scale	p-value
Academic Assistance	0.0001
Career Counseling	0.0184
Initial Impression	0.1264
Attitude Towards Educators	0.1537
Openness	0.2045
Sense of Financial Security	0.2455
Study Habits	0.2566
Financial Support	0.3351
Intellectual Interests	0.3820
Career Planning	0.4755
Family Emotional Support	0.6269
Sociability	0.6798
Self-Reliance	0.7231
Ease of Transition	0.7742
Leadership	0.8270
Personal Counseling	0.8393
Social Enrichment	0.8976
Academic Confidence	0.9543
Desire to Finish College	0.9973

The subsequent post hoc ANOVA was performed to identify which items within the Academic Assistance scale were significant at the p-value < .05 significance level. All six items comprising the Academic Assistance scale were significantly different for the two GPA groups, as was the case in hypothesis one with the persister/non-persister groups. Table V indicates significant differences in all six items comprised in the Academic Assistance scale.

Table V

Summary of Analysis of Variance Comparisons of GPA Groups-Academic Assistance

Source	SS	df	MS	F	p-value
Tutoring					
Between Groups	201.12	1	201.12	43.49	0.0001
Within Groups	6311.76	1367	4.62		
Total	6512.87	1368			
Study Habits Assistance					
Between Groups	141.34	1	141.34	38.57	0.0001
Within Groups	5001.79	1367	3.66		
Total	5143.13	1368			
Writing Skills Assistance					
Between Groups	144.53	1	144.53	35.69	0.0001
Within Groups	5527.29	1367	4.05		
Total	5671.82	1368			
Reading Skills Assistance					
Between Groups	128.31	1	128.31	29.09	0.0001
Within Groups	6020.69	1367	4.41		
Total	6149.00	1368			
Mathematics Assistance					
Between Groups	110.73	1	110.73	24.14	0.0001
Within Groups	6262.37	1367	4.59		
Total	6373.10	1368			
Test Taking Skills Assistance					
Between Groups	57.12	1	57.12	16.7	0.0001
Within Groups	4669.67	1367	3.42		
Total	4726.79	1368			

The final analysis of the Academic Assistance scale involved a t-test to examine the six items within the scale to determine if the mean responses for one group for a particular item were higher than the mean responses of the other group on the same item. The mean responses of the two groups were significantly different on all 6 items within the Academic Assistance scale. The mean scores of the GPA < 2.0 group were higher than the GPA ≥ 2.0 group for all six items of the Academic Assistance scale. While the GPA < 2.0 group mean scores reflected a higher receptivity to services, they were academically unsuccessful. Table VI illustrates the comparisons of means between the GPA groups for the Academic Assistance scale.

Table VI

Summary of t-test Comparisons of Means Between GPA Groups-Academic Assistance

	n	Mean	SD	t	p-value
Tutoring					
GPA < 2.00	363	4.44	2.19	6.59	0.0001
GPA ≥ 2.00	1005	3.57	2.14		
Study habits assistance					
GPA < 2.00	363	5.09	1.81	6.21	0.0001
GPA ≥ 2.00	1005	4.37	1.95		
Writing skills assistance					
GPA < 2.00	363	4.30	2.03	5.97	0.0001
GPA ≥ 2.00	1005	3.56	2.01		
Reading skills assistance					
GPA < 2.00	363	3.72	2.19	5.39	0.0001
GPA ≥ 2.00	1005	3.02	2.07		
Mathematics assistance					
GPA < 2.00	363	3.53	2.26	4.91	0.0001
GPA ≥ 2.00	1005	2.88	2.10		
Test taking skills assistance					
GPA < 2.00	363	5.35	1.76	4.09	0.0001
GPA ≥ 2.00	1005	4.89	1.88		

The Career Counseling scale was also found to be statistically significant for hypothesis two in the initial analysis at the p-value < .05 significance level (Table IV). The subsequent post hoc ANOVA was performed to identify which items within the Career Counseling scale were significant at the p-value < .05 level of significance. One item was significantly different at the p-value < .05 level. The significant item pertained to help with selecting a program of courses to get a good job upon graduation. A second item in the Career Counseling scale was found to be significant at the p-value <.10 significance level. The items are displayed in rank order on level of significance beginning with most significant down to least significant as displayed in Table VII.

Table VII

Summary of Analysis of Variance Comparisons of GPA Groups-Career Counseling

Source	SS	df	MS	F	p-value
Course/program selection assistance					
Between Groups	42.82	1	42.82	9.53	0.0021
Within Groups	6132.91	1367	4.49		
Total	6175.73	1368			
Job selection assistance					
Between Groups	13.12	1	13.12	2.81	0.0938
Within Groups	6370.77	1367	4.67		
Total	6383.9	1368			
Occupation advantages/disadvantages					
Between Groups	5.44	1	5.44	1.37	0.2421
Within Groups	5420.85	1367	3.97		
Total	5426.29	1368			
Job qualifications assistance					
Between Groups	1.35	1	1.35	0.38	0.5375
Within Groups	4860.95	1367	3.56		
Total	4862.3	1368			
Job market assistance					
Between Groups	0.66	1	0.66	0.17	0.6812
Within Groups	5304.54	1367	3.89		
Total	5305.2	1368			

The t-test analysis of the Career Counseling items found that the groups' responses were significantly different at the p-value < .05 level on two of the five items. The mean responses for the Academically Unsuccessful group (GPA < 2.0) were significantly lower than the Academically Successful group (GPA ≥ 2.0) at the .05 significance level. The Academically Unsuccessful group (GPA < 2.0) responded lower on the Likert scale of 1 to 7 with 1 equaling "Not At All True" and 7 meaning "Completely True." The items that comprise the Career Counseling scale are displayed in rank order in Table VIII.

Table VIII

Summary of t-test Comparisons of Means Between GPA Groups-Career Counseling

	n	Mean	SD	t	p-value
Program of courses selection assistance					
GPA < 2.00	363	4.01	2.13	-3.09	0.0011
GPA ≥ 2.00	1005	4.41	2.11		
Job selection assistance					
GPA < 2.00	363	3.69	2.14	-1.68	0.0469
GPA ≥ 2.00	1005	3.92	2.17		
Occupation advantages/disadvantages					
GPA < 2.00	363	3.98	1.93	-1.17	0.1211
GPA ≥ 2.00	1005	4.13	2.02		
Job qualifications assistance					
GPA < 2.00	363	4.66	1.84	-0.62	0.2688
GPA ≥ 2.00	1005	4.73	1.90		
Job market assistance					
GPA < 2.00	363	4.50	1.93	0.41	0.3406
GPA ≥ 2.00	1005	4.45	1.99		

Summary

This research project studied the usefulness of the College Student Inventory (CSI) as a needs assessment tool in community colleges. Of the two null hypotheses postulated at the beginning of the study, significant differences were found in two of the 19 scales. In hypothesis one, significant differences were found in persisters (students who persist) and non-persisters (those who do not persist) in the Academic Assistance scale. In hypothesis two, significant differences were found in academically successful students (GPA $\geq$ 2.0) and academically unsuccessful students (GPA < 2.0) in the Academic Assistance scale and the Career Counseling scale. The two scales, Career Counseling and Academic Assistance, found significant at the p-value < .05 level, contribute to the College Student Inventory general category, Receptivity to Support Services.

Conclusions

The findings of this study expanded the work of previous researchers in the area of student success and retention, specifically in the examination of the College Student Inventory as a needs assessment tool in higher education (Erickson, 1989; Schreiner, 1991; USA Group Noel-Levitz). This investigation revealed that the College Student Inventory distinguishes differences in students who persist and those who do not persist and specific academic groups (GPA $\geq$ 2.0 and GPA < 2.0) on two scales within the general category, Receptivity to Support Services.

When the "persister" and "non-persister" groups were analyzed in hypothesis one, the results indicated that the non-persisters responded higher in their receptivity to academic assistance on all six items in the scale, yet they did not persist. The same results

were found in hypothesis two when the GPA groups were examined; the "academically unsuccessful" students responded higher to receptivity or "need" for academic assistance than the "academically successful" students. When the second scale, Career Counseling, indicated lower responses by the "academically unsuccessful" students to the items in the scale, a pattern emerged. The "non-persisters" and "academically unsuccessful" students in the current study are representative of the high-risk community college student population; a disproportionate percentage of students are underprepared and share characteristics of developmental students who enter college with weak self-concepts, a history of academic failure, uncertain or unrealistic goals, and family and economic difficulties (Roueche & Roueche, 1993).

More questions than answers are raised as to the explanation for the results of this analysis. The non-persisters and academically unsuccessful students apparently recognized their need for academic assistance as evidenced by their responses to the particular items on the College Student Inventory. However, only conjecture can be made as to what may have contributed to their lack of success. Did the students seek academic support services? Were services available? Were the students advised to seek services? Did life issues (i.e. transportation, work, child care demands) influence their choices to seek or not seek academic assistance? Did the students know who to contact, or where to go? Did they understand the value of seeking assistance? Were they embarrassed to ask for help or fearful of being singled out as inferior or different?

In response to the unanswered questions, the researcher is drawn to the literature for answers. A number of explanations could explain the behavior from several theoretical perspectives. Psychological models would focus on the individuals'

characteristics to explain their decision to drop out. Environmental theorists might say that the lack of success in higher education mirrors social stratification in place to preserve patterns of social and educational inequality (Pincus, 1980). An organizational theorist would look for evidence in the institution's structure and social character that contributed to student attrition or lack of academic success.

A review of attrition theories reflects the evolution of the understanding of attrition in terms of the individual, the organization, and ultimately, the interaction between the two to understand the complexity of voluntary student departure from college. Interactionalists, in contrast to aforementioned schools of thought, would explore the interaction of the student and the institution to understand attrition. It is from this perspective that the theoretical framework for the current study was drawn. Specifically, Tinto's interactional model provides the foundation for understanding the dynamic interaction that develops once students enter the institution. Tinto's model of voluntary student departure postulates the direct relationship to individual integration into the academic and social systems of the college with the student's individual attributes, prior experiences, and commitments to continuance in college (Tinto, 1975, 1987, 1993). The student enters the institution with certain background characteristics and commitments. These factors contribute to the individual's level of commitment to the goal of graduation and commitment to the institution. Goals represent the student's intention regarding the education and occupation he or she seeks. Commitments include the student's commitment to both the goals he or she has identified as well as to achieving those goals at a specific institution. These precollege characteristics interact with the student's experiences in the institution's academic and social environments to enhance or reduce

the student's commitment levels, which eventually lead to persistence or departure (Tinto, 1993, 1998). The student's predispositions combined with experiences within the institution lead to varying degree of academic and social integration, the core concept of Tinto's model. Student integration into the social and academic systems of the institution most directly effect persistence.

By understanding the longitudinal process of student departure as it occurs within the organization, and paying attention to the longitudinal process by which students come to voluntarily withdraw from college, Tinto's model provides an explanatory guide for those responsible for student retention. Researchers have provided empirical support of Tinto's theory under differing situations (Nora et al., 1990).

The risk factors that contribute to attrition, ranging from academic predictors to less tangible attributes of entering students, have been clearly identified through extensive research (Allen, 1997; Braxton et al., 1995; Phillippe & Patton, 2000; Tinto, 1993); yet for many students and the institution, the identification of these risk factors came too late. By identifying the factors correlated with attrition early in the higher education experience, institutions can focus resources on those students who are more at-risk. The College Student Inventory assesses student needs early and provides an early-intervention, early-alert system based on student self-reported information (USA Group Noel-Levitz, Inc. 1993). The College Student Inventory has been shown to accurately identify at-risk students for intervention (Schreiner, 1988, 1991). Responses to the College Student Inventory operationalize the social and academic integration constructs and the pre-entry attributes discussed in Tinto's model (1993).

In light of the findings of the current study, one could deduce from Tinto's theory that if goal commitment is determined by the degree to which a student becomes integrated into the academic and social systems of the institution, then it would be plausible to say that the academically unsuccessful students and non-persisters did not integrate successfully into the fabric of higher education. Tinto further posits that both academic and social integration are modified or intensified by a student's precollege commitment to attend a particular institution and to graduate. Strong initial determinants of these two commitments are family background, individual attributes, and high school performance. The literature reminds us that these at-risk students have less likeliness of succeeding for a myriad of reasons, from academic predictors, such as entrance test scores, class rank or high school GPA, and placement tests, to other less perceptible precollege attributes, such as financial inadequacies, relational difficulties, and many other factors (Aitken, 1982; Allen, 1997; Braxton et al., 1995; Schreiner, 1991; Stoecker et al., 1988, Tinto, 1993). Many studies have identified academic performance in college as the single most important predictor of persistence (Pascarella & Terenzini, 1991, Tinto, 1993). Often, at-risk students enter college underprepared academically which lessens their likeliness for success.

Such evidence was found in the current study. For instance, in hypothesis two that sought to distinguish difference in academically successful and academically unsuccessful students on the 19 scales of the College Student Inventory, the "academically successful" students' higher scores on the items in the Career Counseling scale could be interpreted to mean that these students entered college with goals and commitments to complete their education. The impact of incoming student goals and

commitments on eventual persistence or departure behavior has been the focus of much research (Tinto, 1993). Likewise, Astin (1975) concluded that, after taking into account high school academic performance, educational aspiration is one of the top predictors of persistence. Students with the highest degree aspirations are least likely to drop out. Stoecker, Pascarella, and Wolfle (1988) measured goal commitment as the combination of degree aspiration and degree commitment. Stoecker et al. found that while goal commitment did not have a significant direct association with persistence, goal commitment has a significant indirect effect on persistence, mediated through social integration and subsequent goal commitments. Abbott (1996) found evidence to support the proposition that student integration into the academic and social environments at college would be related to persistence behavior; all measures of social and academic integration were higher for persisters than departers.

The challenge facing community colleges is to find the magic quotient that will work with the increasing diversity of at-risk students. Progress is being made; however, community colleges reporting the greatest success in retaining high-risk students are moving beyond the traditional classroom methods and organizational schemas. Tinto admits that "meeting the obligation of involving our students through improved academic experiences is no small proposition" (Tinto, 1996). However, by implementing learning communities and adopting learning organization principles, students will begin to engage in shared learning experiences that support social and academic integration and, ultimately, academic success and persistence (O'Banion, 1997; Tinto, 1998).

Implications

Recently, educators have claimed that the community college will embark on a more arduous task than ever before—educating America's newest challenge, the underprepared or at-risk student, the new majority on these campuses (Roueche & Roueche, 1993). Findings from the current study can contribute to the construction of a roadmap needed to guide high-risk students toward success in higher education. The charge demanding attention of policy makers is laden with tough decisions at the heart of matter—the institution's commitment to student success.

Interest in the community college and its students has led to a well-defined profile of the non-traditional students they serve. Further, a generation of explanatory theories of attrition has provided a description of the complex processes that contribute to voluntary student departure. Theoretical perspectives, such as Tinto's interactional model, have moved beyond merely describing the phenomenon to providing direction for institutions to combat attrition. By offering principles of attrition that form the basis of the discussion of institutional policy, Tinto stresses that the secret to successful retention programs is the interplay between the institution and students, and most importantly, the institution's commitment to students (Tinto, 1993). What is needed is institutional commitment to make the tough decisions necessary to help this "new majority" succeed. The solutions are not without risk, particularly when enrollment growth is essential in an era of shrinking resources.

A well-organized, comprehensive student retention plan is recommended to foster the success of new students, and particularly the at-risk students. At the forefront of the plan is the need for proper placement and assessment of both academic and personal

needs. An early-intervention, early-alert system is recommended. The findings of the current study support the use of the College Student Inventory as a needs assessment tool. The CSI provides a means to identify students who are at risk for academic and/or personal difficulties. By identifying students' needs, attitudes, motivational patterns, resources, coping mechanisms and receptivity to intervention through the CSI, the institution is making a commitment to the student (USA Group Noel-Levitz, 1993). It is recommended that early warning systems include intrusive advising policies that set parameters for incoming students identified as high-risk. Intrusive measures could include limiting the allowable number of credit hours during the first semester based on placement scores. The current research found that low-achieving and non-persisting students recognized their need for help, yet they were not successful. Resources and programs are needed to serve these students during the critical first-year college experience to ensure their success.

Research on student success supports the importance of a caring faculty (Conklin, 1996). Include in the retention plan opportunities for faculty development programs that stress teaching effectiveness and understanding the different learning styles of students. Build upon academic support programs to develop new resources to strengthen student study skills. Include faculty in the exploration of retention issues. Introduce innovative learning practices found to improve student retention that involve students in education, thereby enhancing their learning and increasing their persistence (Tinto, Russo, Kadel-Taras, 1996).

The development of high school outreach programs is recommended. Continue to build upon school partnerships by communicating the importance of academic

achievement and setting goals toward college early. Introduce school partners and parents to the importance of developmental education in higher education, particularly in schools with large populations of students who identify with the at-risk profile. Begin intervening with these students earlier than upon arrival in higher education. Continue to promote transfer to four-year institutions.

The most innovative community colleges will continue to move away from highly bureaucratic models that emphasize subject and discipline divisions, individual learning in competitive education settings, and the separation of student affairs from academic affairs to adopting a community-based model of education that encourages learning through collaboration and ties together all facets of students' college experiences (Tinto, 1996). Retention will become an outcome rather than a goal when the institution's primary emphasis is placed on student success.

Recommendations for Further Research

The findings of this research have pointed to areas where additional research may be fruitful. The current study examined enrollment data and student responses to the College Student Inventory from several community colleges in the northern, western, and eastern regions of the United States. A replication of this study in the southern region of the country is suggested to determine differences or similarities.

Innovative practices should be explored in future research through a variety of longitudinal, qualitative, and quantitative studies. Investigation of the impact that learning communities and collaborative learning strategies have on student success and persistence is recommended.

Persistence in the current study was measured in the period of one year. A longitudinal study of an institution's enrollment patterns over a period of years that tracks students beyond the first year's enrollment would offer another dimension to the effectiveness of the College Student Inventory.

While researchers are interested in measuring the validity and reliability of assessment instruments, such as the College Student Inventory, qualitative studies through ethnographic accounts of actual student experiences would provide a richness of information unattainable through quantitative measures. Learning will be "immeasurably enriched through the use of multi-method, quantitative and qualitative, case studies" (Tinto, 1998).

In closing, to be in alignment with the national policy on education, the academic arena is evolving to become student-based rather than institution-centered. Building a bridge to the new millennium, education must not be left behind; therefore, through collaborative involvement between all facets of the halls of education will the students be able to arrive and leave more academically secure and grow into productive individuals.

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